microfluidic channels and switching junctions may be set flat against an array of VCSELs, each VCSEL "addressing" and associated switching junction most commonly downstream of some sensing location. As each particle moves by it may be selectively "switched" into one or another channel, including under computer control. In this manner highly parallel and cost effective cell analysis and sorting may he achieved.

4. Particular VCSEL Optical Tweezers In Accordance with the Present Invention

Optical tweezers and tweezer arrays have historically been generated in a number of ways including through the use of a rapid scan device, diffractive gratings or a spatial light modulator. Typical implementations of these techniques use the beam from a single high powered laser that is temporally or spatially divided among the various optical spots that are generated.

In implementation of optical tweezers and tweezer arrays in accordance with the present invention Vertical Cavity Surface Emitting Lasers (VCSELs) and VCSEL arrays are used where each VCSEL laser in the array is focused so as to individually act as trap See Fig. 1. In this manner, precise uniformity or selective control over each trap can be achieved by appropriately modulating the current to each VCSEL. VCSEL arrays provide a compact package, they are potentially very cheap, and the substrate is compatible with other optoelectronic functions that may be desired in a bio-chip such as array detectors.

The main drawback of VCSELs as optical tweezers is their relatively low output power, and therefore low trapping strength. In accordance with the present invention, this disadvantage is at least partially compensated by permanently changing the lasing mode of the VCSEL prior to use. In accordance with the technique of U.S. patent application serial no. 09/___,___, the contents of which application are incorporated herein by reference, the spatial emission mode of a packaged midsize proton-implant VCSEL is

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